

1. In a regenerator comprising multiple layers of foil, an improvement comprising:

wherein said grooves on said first surface are oriented normal to the overall direction of flow in said regenerator, and

wherein intersections of said grooves on said first surface and said grooves on said second surface comprise holes in said layer of foil.

2. In a regenerator comprising multiple layers of foil, an improvement comprising:

wherein said grooves on said first surface are slanted relative to the overall direction of flow in said regenerator, and

wherein said grooves on said first surface intersect said grooves on said second surface, and

wherein the intersections of said grooves on said first surface and said grooves on said second surface comprise holes in said layer of foil.

3. The improvement of claim 1 wherein said layer of foil is comprised of stainless steel.

4. The improvement of claim 2 wherein said layer of foil is comprised of stainless steel.

5. The improvement of claim 1 wherein said grooves on said first surface are formed by etching.

6. The improvement of claim 2 wherein said grooves on said first surface are formed by etching.
7. The improvement of claim 5 wherein said grooves on said second surface are formed by etching.
8. The improvement of claim 6 wherein said grooves on said second surface are formed by etching.
9. The improvement of claim 1 wherein the depth of said grooves on said first surface is between 50% and 60% of the greatest thickness of said layer of foil.
10. The improvement of claim 2 wherein the depth of said grooves on said first surface is between 50% and 60% of the greatest thickness of said layer of foil
11. The improvement of claim 9 wherein the depth of said grooves on said second surface is between 50% and 60% of the greatest thickness of said layer of foil.
12. The improvement of claim 10 wherein the depth of said grooves on said second surface is between 50% and 60% of the greatest thickness of said layer of foil.
13. In a foil regenerator, an improvement comprising:
 - multiple alternate layers of solid foil and spacer foil,
 - wherein a layer of said spacer foil contains a multiplicity of grooves on a first surface thereof and a multiplicity of grooves on a second surface thereof, and
 - wherein said grooves on said first surface intersect said grooves on said second surface, and
 - wherein intersections of said grooves on said first surface with said grooves on said second surface comprise holes in said layer of spacer foil, and

wherein grooves on said first surface are angled relative to the overall direction of flow in said foil regenerator.

14. The improvement of claim 13 wherein said grooves on said second surface of said layer are angled relative to the overall direction of flow in said foil regenerator.

15. The improvement of claim 13 wherein the material of said layers of solid foil comprises the element lead.

16. The improvement of claim 13 wherein the material of said layers of solid foil comprises an alloy containing an element selected from the group of elements consisting of cerium, dysprosium, erbium, europium, gadolinium, holmium, lanthanum, lutetium, neodymium, praseodymium, promethium, samarium, terbium, thulium and ytterbium.

17. The improvement of claim 13 wherein a portion of the material of said layers of solid foil comprises the element lead and an adjacent portion of the material of said layers of solid foil comprises an alloy containing an element selected from the group of elements consisting of cerium, dysprosium, erbium, europium, gadolinium, holmium, lanthanum, lutetium, neodymium, praseodymium, promethium, samarium, terbium, thulium and ytterbium.

18. The improvement of claim 13 wherein said grooves on a surface of said layer of said spacer foil are formed by etching.

19. The improvement of claim 13 wherein the depth of said grooves on said first surface is between 50% and 60% of the greatest thickness of said layer of said spacer foil.

20. The improvement of claim 19 wherein the depth of said grooves on said second surface is between 50% and 60% of the greatest thickness of said layer of said spacer foil.